Claims

1. Device for measuring reflection and transmission properties of objects and surfaces having:

a housing;

an optical measuring base unit comprising at least one measuring means for detecting reflection and transmission radiation by means of at least one sensor means; and

at least one retaining means for the elastic retention of said optical measuring base unit within said housing;

whereby said optical measuring base unit comprises at least one touchdown means for setting said optical measuring base unit down upon a surface to be measured; and

whereby a base surface of said optical measuring base unit assumes a predetermined elastically adjustable position relative the housing in the unpositioned state.

2. Device according to claim 1, **characterized in that**
said optical measuring base unit is provided for measuring at least one characteristic parameter of said measurement surface, whereby at least one of said at least one characteristic parameter is taken from among a group of parameters which includes gloss, haze, florescence, distinction of image (DOI), a representative measure of typical wavelengths and their amplitudes (orange peel) of the surface topology of said measurement surface at a predetermined wavelength interval, whereby an evaluation may also ensue at two or more wavelength ranges when determining said representative measure, and a color of said surface.

3. Device according to claim 2, **characterized in that**
two, three or more characteristic parameters of said measurement surface are ascertainable.

4. Device according to at least one of the preceding claims, **characterized in that** said base surface of said optical measuring base unit encompasses at least one contact surface of said touchdown means with said surface to be measured.

5. Device according to at least one of the preceding claims, **characterized in that** said touchdown means encompasses at least one supporting means, whereby at least one of said at least one supporting means contacts said surface to be measured in the positioned touchdown state.

6. Device according to at least one of the preceding claims, **characterized in that** at least one supporting means comprises at least one length control means which enables an elastic length change of said supporting means.

7. Device according to at least one of the preceding claims, **characterized in that** at least one retaining means comprises a guiding means so that said optical measuring base unit is arranged displaceable in at least one direction in said guiding means.

8. Device according to at least one of the preceding claims, **characterized in that** at least one of said at least one guiding means comprises a reset means so that a resetting force is introducible to said optical measuring base unit at least in the positioned touchdown state.

9. Device according to at least one of the preceding claims, **characterized in that** a means is provided for determining of alignment of the base surface to the measurement surface.

10. Device according to at least one of the preceding claims, **characterized in that** a detecting means is provided for the detecting of at least one change in condition of the optical measuring base unit induced by touchdown on the

measurement surface, whereby said change in condition is taken from among a group comprising changes in condition which encompass a change in position of said optical measuring base unit relative said housing and a change in pressure on said touchdown means.

11. Device according to at least one of the preceding claims, **characterized in that** said detecting means detects changes in position from at least one displacement of said optical measuring base unit at at least one point essentially perpendicular to said measurement surface.

12. Device according to at least one of the preceding claims, **characterized in that** an activating means is provided to activate the measuring means upon attaining a suitable alignment of said base surface and measurement surface.

13. Device according to at least one of the preceding claims, **characterized in that** at least one detecting means, which detects at least one change in position of said optical measuring base unit relative said housing, comprises a means for determining contingencies taken from among a group of means configured for such determinations such as capacitive measuring means for deriving changes in the capacitance of a capacitor means, inductive measuring means for deriving changes in inductance, resistive measuring means for deriving changes in resistance, force measuring means for deriving changes in the force exerted on said retaining means, and other such similar means.

14. Device according to at least one of the preceding claims, **characterized in that** said detecting means detects changes in pressure occurring at the contact surface, whereby said detecting means is preferably disposed as a capacitive and/or as a local resolution detecting means.

15. Device according to at least one of the preceding claims, **characterized in that** said detecting means comprises at least one light barrier means, whereby at least one light barrier means emits a signal when at least a part of said optical measuring base unit undergoes a predetermined change in position.

16. Device according to at least one of the preceding claims, **characterized in that** at least one retaining means of said optical measuring base unit is urged by at least one compressing means toward an interior surface of said housing, whereby said compressing means is taken from among a group comprising spring means, foam and durofoam means, rubber means and in particular hard rubber means, helical spring means, and other such similar means.

17. Device according to at least one of the preceding claims, **characterized in that** said housing has an interior transverse carrier means which at least comprises one partially hollow lug with a spring element supported therein, whereby at least one spring element presses against a part of said optical measuring base unit.

18. Device according to at least one of the preceding claims, **characterized in that** said transverse carrier means is disposed with an opening through which the lugs provided on the optical measuring base unit extend into the interior of the housing, and at least one of said one least light barrier means is activated by a disk means affixed to an end of said lug.

19. Device according to at least one of the preceding claims, **characterized in that** wheels are disposed on said housing and/or said optical measuring base unit.

20. Device according to at least one of the preceding claims, **characterized in that** said measuring base unit furthermore comprises at least one source of radiation, the radiation emitted therefrom being directed at least partially at a predetermined angle to the surface to be measured.

21. Device according to at least one of the preceding claims, **characterized in that** said housing can be set down upon the surface to be measured for taking a measurement such that at least one part of said housing preferably comes into direct contact with said surface to be measured.

22. Device according to at least one of the preceding claims, **characterized in that** at least one part of said optical measuring base unit protrudes from said housing in unpositioned state.

23. Device according to at least one of the preceding claims, **characterized in that** touching said housing down upon the surface to be measured induces a displacement of said optical measuring base unit within said housing.

24. Device according to at least one of the preceding claims, **characterized in that** said housing encompasses at least one housing supporting means whereby said housing supporting means is in direct contact with the surface to be measured in positioned touchdown state.

25. Device according to at least one of the preceding claims, **characterized in that** said optical measuring base unit is pivotally arranged within said housing relative at least one pivotal axis.

26. Device according to at least one of the preceding claims, **characterized in that** at least one of said at least one pivotal axis is aligned essentially parallel to the surface to be measured.

27. Device according to at least one of the preceding claims, **characterized in that** said pivotal axis is aligned essentially perpendicular to a connecting segment between two supporting means of said optical measuring base unit, whereby said pivotal axis is preferably arranged essentially centrally between said two supporting means.

28. Device according to at least one of the preceding claims, **characterized in that** a clearance distance of said pivotal axis to the surface to be measured is smaller than a length of said connecting segment and preferably smaller than half or a third of the length of said connecting segment.

29. Device according to at least one of the preceding claims, **characterized in that** said pivotal axis is retained displaceably on said guiding means.

30. Device according to at least one of the preceding claims, **characterized in that** a length control means is provided in at least one and preferably in essentially each supporting means so that the longitudinal extension of at least one supporting means may be adjusted.

31. Device according to at least one of the preceding claims, **characterized in that** at least one clearance distance to the surface to be measured is determinable at at least two points of said housing and/or optical measuring base unit, whereby said clearances are determined through the evaluation of the signals emitted by at least one transmitting means and received by at least one receiving means, whereby at least one of said transmitting means emits signals which are taken from among a group which encompasses electromagnetic and/or sound waves, and whereby said evaluation ensues by utilizing a method encompassing methods of running time measurement, triangulation, or interference evaluation, whereby a representative measure of curvature for the surface is derived from said clearance.

32. Device according to at least one of the preceding claims, **characterized in that** a pattern projection means is provided for projecting a light pattern onto the surface to be measured in which a sensor means receives the light reflected from the measurement surface and a representative measure of curvature for the measurement surface is derived in at least one direction from evaluating the light intensity profile.

33. Device according to at least one of the preceding claims, **characterized in that** a tilting of said optical measuring base unit relative the surface to be measured can be determined so that measurement values can be corrected thereto.

34. Device according to at least one of the preceding claims, **characterized in that** at least four clearance sensors are arranged in such a manner that at least one tilting of said optical measuring base unit relative the surface to be measured can be determined and that a Wheat stone bridging circuit means is provided, the signal of which can be used to control the length control means of the supporting means so as to attain an alignment of the base surface to the surface to be measured which is within a permissible range.

35. A method for operating a device according to at least one of claims 1-38 comprising the steps:

i) setting of the device down on the measurement surface;

ii) detecting a change in condition of said optical measuring base unit relative the housing induced by setting down of the touchdown means on the measurement surface;

iii) determining whether said change in condition indicates a permissible alignment of said base surface and said measurement surface; and

iv) activating of a measurement when said change in condition indicates a permissible range for the alignment of said base surface and said measurement surface.

36. Method according to claim 35, **characterized by the step:**

- deactivating of a measurement when said change in condition exceeds a predefined tolerance deviation from the permissible alignment of said base surface and said measurement surface.

37. Method according to claim 35 or 36, **characterized by the step:**

- emitting of a warning signal when said change in condition exceeds a predefined tolerance deviation from the permissible alignment of said base surface and said measurement surface.